

New survey data on pension benefits

*Defined pension benefit plans—
those that spell out benefits
usually in terms of salaries and service—
provide widely varying benefits
to retirees and their survivors*

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A worker approaching the end of his or her career must consider a variety of factors in deciding whether and when to retire. Future expenses, living arrangements, and leisure activities must be examined, as well as the sources and amounts of retirement income available. Pension benefits can be a major source of retirement income, although they can vary widely based on an employee's age and work history.

Employer-provided pension plans often allow employees to retire and begin receiving benefit payments prior to age 65, the customary retirement age in the United States. In private establishments employing 100 or more workers in 1989, nearly 90 percent of full-time participants in defined benefit pension plans could retire at age 55 or earlier, although typically with benefits reduced to account for their receipt over a longer period of time. Furthermore, pension benefits without reductions were available prior to age 65 to nearly 2 out of 3 plan participants.

These data suggest that the "golden years" of retirement can begin sooner than many workers may have expected. But what pension benefits are available for these younger retirees? New data from the Bureau of Labor Statistics indicate that the percent of an employee's preretirement salary replaced by benefits from a pension plan can vary widely—from under 10 percent for some retirees aged 55 to more than 40 percent for some retirees aged 65. This article examines workers' replacement rates—the percentage of

the final year's salary provided by a pension payment.

Pension benefits are not the only source of retirement income available to retirees. Such income is generally thought of as coming from three sources: employer-sponsored benefit plans; government benefit plans, particularly Social Security; and personal savings. Social Security, when available, can replace up to 40 percent of an employee's preretirement salary. Employer plans other than pensions, such as savings and thrift plans and profit-sharing plans, can also provide retirement income, as can personal savings. Moreover, retirees usually do not require 100-percent replacement of their final salary, due to changes in their tax status, expenses, and lifestyle.¹

The newly available Bureau data on pension plan payments allow an analysis that expands upon earlier work on the subject first published in 1985.² At that time, analysis was limited to employees retiring at age 65. The new analysis looks at the effect of age, as well as salary and years of participation in a pension plan, on the amount of benefits received. Also presented for the first time are data on survivor benefits payable from pension plans.

Data for the analysis are from the Bureau's 1989 Employee Benefits Survey of full-time employees in medium and large private establishments—that is, establishments employing 100 workers or more. The annual survey provides data on the extent of participation in pen-

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Chart 1. Average pension and Social Security benefit payments based on 30 years of plan participation and final annual salary of \$35,000, full-time employees in medium and large private establishments, 1989



sion plans and on the varying details of the plans; similar data are available for numerous other benefits.³ The 1989 survey covered 32 million full-time employees in about 109,000 medium and large private establishments.

Overview

Chart 1 indicates the percentage of final salary that would continue to be received in the form of pension and Social Security benefits for employees retiring at three different ages. At age 55, when no Social Security benefits are available, the average pension equals about 20 percent of final salary. The figure diminishes slightly if survivor benefits are chosen and drops below 10 percent for the surviving spouse. At age 62, the data change dramatically, as Social Security becomes available and pension amounts increase. Average benefits at this age are just over 50 percent of final salary for single employees and nearly 60 percent for married employees. Furthermore, surviving spouse benefits increase to nearly 40 percent of final salary, on average. Similar increases, mostly due to higher Social Security benefits, are seen at age 65.

Several patterns can be observed in the chart. First, pension benefits increase as retirement age increases, even when employees have similar

work histories. Second, Social Security provides a large portion of total retirement benefits, especially for married couples and surviving spouses. Finally, while surviving spouse benefits are universally available as a part of pension plans, the amount of such benefits can be relatively small, regardless of the age of the retiree.

Defined benefit pension plans

The benefit amounts presented in this article are calculated from *defined benefit pension plans*. According to the Employee Benefits Survey, 63 percent of full-time employees in medium and large private establishments participated in defined benefit pension plans in 1989. As the term implies, such plans specify—through a fixed formula typically based on salary and length of time as a plan participant—the amount of pension payment a retiree will receive. For example, a plan might specify annual benefits equal to 1 percent of final salary multiplied by the number of years of participation in the plan. For an employee with 30 years of participation and a final salary of \$35,000, the annual benefit would then be \$10,500 (1 percent x \$35,000 x 30 years), or \$875 per month. (More commonly, when salary is included in the pension formula, it is

typically defined as an average of career salary or of salary in the last few years prior to retirement.)

Another type of defined benefit pension plan, more prevalent among blue-collar than white-collar workers, specifies a fixed dollar amount per year of participation in the plan, regardless of salary. For example, if the plan specified a benefit of \$20 a month times the number of years of participation in the plan, an employee retiring with 30 years would receive a \$600 monthly pension ($\20×30 years).

The following tabulation shows the percent of participants in defined benefit pension plans in 1989, according to the type of formula used to determine benefits:

	<i>Participants (percent)</i>
All participants	100
Formula used:	
Percent of salary in final year(s)	64
Percent of average salary throughout career	11
Dollar amount times years of service	22
Other formula ⁴	3

In addition to providing information on benefit formulas, the Employee Benefits Survey gives data on numerous other plan provisions needed to determine the amount and timing of benefits. Such data include age and length-of-service requirements that employees must meet in order to retire; minimum and maximum restrictions imposed on the dollar amount of benefits received; alternative benefit formulas used to guarantee a certain level of payment for older workers with short lengths of service; and offsets to benefits imposed to account for employer contributions to Social Security.⁵

Because of this wide range of plan provisions, it is difficult to compare individual pension plans strictly on their characteristics. For example, which is more advantageous, a plan providing a benefit equal to 2 percent of average career salary times the number of years of participation in the plan, or one providing a benefit of 1 percent of final year salary times the number of years of participation? Similarly, is a plan that provides a pension benefit to all employees who complete 30 years of service, regardless of age, better than a plan providing the same ben-

Table 1. **Average percent of final salary replaced by defined benefit pension plan payments, by retirement age and years of participation in plan, full-time employees in medium and large private establishments, 1989**

Retirement age and final annual salary	Years of participation in plan						
	10	15	20	25	30	35	40
Age 55							
\$15,000	7.6	11.1	15.6	19.0	25.3	29.4	32.9
20,000	7.2	10.5	14.4	17.6	22.7	26.3	29.4
25,000	7.0	10.0	13.7	16.8	21.4	24.8	27.6
35,000	6.7	9.8	13.4	16.6	20.6	23.9	26.5
45,000	6.7	9.9	13.3	16.6	20.5	23.8	26.3
55,000	6.8	10.0	13.5	16.8	20.6	23.8	26.3
Age 60							
\$15,000	10.6	15.5	20.9	26.0	31.2	35.3	39.4
20,000	9.8	14.3	19.0	23.4	28.1	31.5	35.1
25,000	9.5	13.5	17.9	22.1	26.5	29.8	33.0
35,000	9.0	13.1	17.4	21.5	25.7	28.9	31.8
45,000	8.9	13.2	17.2	21.4	25.6	28.7	31.5
55,000	9.0	13.2	17.4	21.6	25.8	28.9	31.5
Age 62							
\$15,000	11.6	16.9	22.6	27.7	33.1	37.5	41.8
20,000	10.8	15.6	20.6	25.0	29.7	33.5	37.3
25,000	10.4	14.7	19.3	23.6	28.1	31.6	35.1
35,000	9.9	14.3	18.8	23.0	27.4	30.8	34.0
45,000	9.8	14.3	18.7	23.0	27.4	30.8	33.8
55,000	9.9	14.5	18.9	23.2	27.7	31.0	33.9
Age 65							
\$15,000	12.7	18.6	24.1	29.2	34.4	39.2	43.7
20,000	11.6	16.9	21.9	26.4	30.9	35.2	39.2
25,000	11.2	16.0	20.6	25.1	29.4	33.4	36.9
35,000	10.6	15.4	20.1	24.6	28.9	32.6	35.9
45,000	10.5	15.4	20.0	24.7	29.0	32.6	35.7
55,000	10.6	15.5	20.3	25.0	29.3	32.9	35.9

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

Table 2. **Percent of defined benefit pension plan participants eligible for benefits at selected ages and years of participation in plan, full-time employees in medium and large private establishments, 1989**

Age and eligibility	Years of participation in plan				
	10	15	20	25	30
Age 55					
Eligible for benefits	66	78	84	86	91
Unreduced normal retirement benefits..	(¹)	1	5	7	19
Reduced early retirement benefits	66	77	78	79	71
Age 60					
Eligible for benefits	79	90	96	96	99
Unreduced normal retirement benefits..	10	13	18	25	37
Reduced early retirement benefits	69	77	78	71	62
Age 62					
Eligible for benefits	83	93	98	98	99
Unreduced normal retirement benefits..	34	39	45	50	60
Reduced early retirement benefits	49	53	53	49	39

¹ Less than 0.5 percent.

NOTE: Because of rounding, sums of individual items may not equal totals.

efit to employees who reach age 62 and complete 30 years of service? Clearly, it is difficult to say.

To overcome the difficulties involved, a dollar payment and, from that, a percentage of final salary, or replacement rate, can be computed for each plan. Thus, given certain assumptions regarding age, salary, and length of participation, a direct comparison of individual plans can be made based on the percent of final salary each will replace.

For example, compare again the aforementioned two plans, one providing a benefit equal to 2 percent of average career salary times the number of years of participation in the plan, and the other providing a benefit of 1 percent of final year salary times the number of years of participation. Once it is known that the final salary is \$35,000 and that the employee's 30-year career salary averaged \$15,000 per year, a decision as to which plan is more advantageous becomes possible. The career average plan yields a \$9,000 annual pension (\$15,000 career average salary x 2 percent x 30 years), whereas the final salary plan yields a \$10,500 annual pension (\$35,000 final salary x 1 percent x 30 years). The replacement rates are then 25.7 percent (\$9,000/\$35,000) for the career average plan and 30 percent (\$10,500/\$35,000) for the final average plan.

The model constructed to compute the replacement rates presented in this article determines benefits for employees retiring at different ages, with different lengths of participation and different salary histories. The appendix describes in detail the assumptions and calculations used to determine the pension benefits from which the replacement rates were derived.

Replacement rates

For those pension plan participants eligible to retire at age 55 after completing 10 years of participation, the average replacement rate for a final salary of \$35,000 was 6.7 percent in 1989. (See table 1.) With 20 years of participation, the average replacement rate increased to 13.4 percent, and with 30 years of participation, it rose to 20.6 percent. This rise in the replacement rate with the number of years of participation in the plan is expected, because all of the pension plans studied include the length of participation in the computation of benefits.⁶ Some plans impose a cap on the number of years of participation included in the pension calculation, often 25, 30, or 35 years. In addition, some plans provide different benefit amounts at different intervals (for example, 1 percent of salary for each of the first 20 years of participation and 1.5 percent of salary for each year beyond 20). When these provisions apply, average replacement rates do not increase uniformly with participation.

Salary also affects replacement rates. At age 62 with 30 years of participation, the average replacement rate for retirees with a final salary of \$15,000 was 33.1 percent in 1989. For the same retirement age and number of years of participation, a final salary of \$25,000 had a replacement rate of 28.1 percent, and a final salary of \$45,000 yielded a 27.4-percent replacement rate. This variation in average replacement rates is based on several factors built into pension plan formulas:

- Benefits computed by a dollar-times-years-of-participation formula do not change as

salary changes. Because of this, replacement rates for workers under such plans decline as final salary increases. (See the appendix for a discussion of replacement rates by occupational group, where the effect of pension formulas on replacement rates is treated in more detail.)

- Some pension formulas vary their benefit percentages with final salary. For example, a plan might provide benefits equal to 1 percent of the first \$40,000 of final salary and 1.5 percent of the portion of final salary above \$40,000, times years of participation. Such a formula will yield replacement rates that rise slightly as salary rises.⁷
- A plan's formula may include a reduction in the computed benefit based on expected Social Security benefits. Social Security benefits are designed to provide a higher percent of preretirement salary for lower paid than higher paid employees.⁸ Thus, the reduction in the pension will be smaller, as a percent of salary, as final-year income increases. Plans specifying a pension reduction as a percent of Social Security benefits will therefore yield replacement rates that rise slightly as salary increases.

Finally, the retiree's age can affect pension benefits. In a few instances, this is because the plan specifies different benefit amounts at different ages. (For example, a plan might provide 1 percent of final salary times number of years of participation up to age 50 and 1.5 percent for participation beyond age 50.) More often, benefits vary by age because plans impose reductions if benefits are received before a given age, as described in the next section.⁹

Normal and early retirement

Defined benefit pension plans specify age and length-of-service requirements for retirement with *normal retirement* benefits. Once these thresholds are met, normal retirement benefits are derived from the plan's formula, regardless of the age of the retiree. Plans often specify more than one set of normal retirement requirements, allowing workers with different employment histories the opportunity to receive benefits. For example, a plan may specify that normal retirement benefits are available if one of the following sets of requirements is met: age 65 with 5 years of service; age 60 with 20 years of service; or age 55 with 30 years of service.

Nearly all plans also offer *early retirement* benefits to those retiring before the normal retirement age. Payments in these instances are computed from the plan's normal retirement formula, but are reduced to account for receipt over a longer period of time. In a plan with normal retirement benefits available at age 65 with 5 years of service, early retirement might be available at age 60 with 10 years of service and age 55 with 20 years of service. Reductions imposed on such benefits are typically a specified percent for each year the employee is younger than the normal retirement age.¹⁰

The model computes retirement benefits by first determining whether, for each age and length-of-plan-participation profile, unreduced normal retirement benefits, reduced early retirement benefits, or no benefits are available. As expected, greater percentages of workers are eligible to retire, and to retire with unreduced benefits, as age and length of participation increase. For example, in 1989, at age 55 with 10

Table 3. **Average percent of \$35,000 final annual salary replaced by defined benefit pension plan payments at normal and early retirement, by retirement age and years of participation in plan, full-time employees in medium and large private establishments, 1989**

Retirement age and type of benefit	Years of participation in plan				
	10	15	20	25	30
Age 55					
Unreduced normal retirement benefit . . .	11.4	20.7	22.2	26.9	29.6
Reduced early retirement benefit	6.6	9.8	12.8	15.7	18.1
Age 60					
Unreduced normal retirement benefit . . .	12.7	18.6	22.6	26.7	29.7
Reduced early retirement benefit	8.4	12.3	16.2	19.7	23.3
Age 62					
Unreduced normal retirement benefit . . .	11.2	16.7	21.6	26.1	30.2
Reduced early retirement benefit	8.9	12.6	16.5	19.8	22.9

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

Table 4. **Average percent of final salary replaced by defined benefit pension plan and Social Security payments, by retirement age and length of participation in plan, full-time employees in medium and large private establishments, 1989**

Retirement age, final annual salary, and source of benefits	Years of participation in plan						
	10	15	20	25	30	35	40
Age 62							
\$15,000—total	31.5	40.6	49.9	58.7	67.8	74.5	78.8
Pension	11.6	16.9	22.6	27.7	33.1	37.5	41.8
Social Security	19.9	23.7	27.4	31.0	34.7	37.0	37.0
\$25,000—total	25.4	33.4	41.6	49.2	57.1	62.8	66.4
Pension	10.4	14.7	19.3	23.6	28.1	31.6	35.1
Social Security	14.9	18.6	22.2	25.6	29.0	31.2	31.3
\$35,000—total	22.7	30.5	37.7	44.3	50.8	55.1	58.2
Pension	9.9	14.3	18.8	23.0	27.4	30.8	34.0
Social Security	12.8	16.2	18.8	21.3	23.5	24.2	24.3
\$45,000—total	21.1	28.3	34.7	40.9	46.4	50.3	53.3
Pension	9.8	14.3	18.7	23.0	27.4	30.8	33.8
Social Security	11.3	14.0	16.0	17.9	18.9	19.5	19.5
Age 65							
\$15,000—total	37.9	48.7	59.2	69.1	79.2	84.0	88.5
Pension	12.7	18.6	24.1	29.2	34.4	39.2	43.7
Social Security	25.3	30.2	35.0	39.9	44.8	44.8	44.8
\$25,000—total	30.4	40.1	49.5	58.5	67.1	71.5	75.2
Pension	11.2	16.0	20.6	25.1	29.4	33.4	36.9
Social Security	19.2	24.1	28.9	33.4	37.8	38.2	38.3
\$35,000—total	27.2	36.6	44.8	52.5	58.4	62.2	65.6
Pension	10.6	15.4	20.1	24.6	28.9	32.6	35.9
Social Security	16.7	21.2	24.6	27.9	29.4	29.6	29.6
\$45,000—total	25.3	33.8	41.1	47.4	52.8	56.5	59.7
Pension	10.5	15.4	20.0	24.7	29.0	32.6	35.7
Social Security	14.9	18.4	21.1	22.6	23.8	23.9	23.9

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan. Because of rounding, sums of individual items may not equal totals.

years of participation, 66 percent of participants could retire; nearly all of these would receive reduced early retirement benefits. At age 55 with 30 years of participation, 91 percent could retire, and of these, about 20 percent could receive unreduced normal retirement benefits. When age increased to 62, 83 percent of participants could retire with 10 years of participation, with about 40 percent of that group eligible for unreduced benefits. Finally, at age 62 with 30 years of participation, nearly all participants could retire, and 60 percent of those who could would be eligible to receive unreduced benefits.¹¹ (See table 2.)

For all pension plan participants eligible to retire at age 55 with 20 years of participation, whether with reduced or unreduced benefits, the replacement rate for the retiree with a final salary of \$35,000 averaged 13.4 percent in 1989. The same employees could expect an average replacement rate of 17.4 percent if they retired at age 60, 18.8 percent at age 62, and 20.1 percent at age 65. Because unreduced benefits often can be received prior to age 65, the rate of increase in replacement rates slows as age increases.

As expected, replacement rates vary widely depending on whether they are computed using the unreduced normal retirement benefit for-

mula or the reduced early retirement formula. For example, a participant eligible for normal retirement benefits at age 55 with 30 years of participation and a final salary of \$35,000 had an average replacement rate of 29.6 percent, compared with 18.1 percent for those eligible for early retirement. At age 62 with 30 years of participation and a \$35,000 final salary, the average rates were 30.2 percent for normal retirement and 22.9 percent for early retirement. (See table 3.)

Social Security benefits

A retiree's age is important not only because it influences the amount of the private pension benefit received, but also because it determines the availability and amount of Social Security payments. Social Security benefits for older Americans (as opposed to those for disabled Americans and survivors of deceased workers) are available beginning at age 62. Full, unreduced (normal retirement) benefits are currently available at age 65; the age for eligibility will gradually rise to 67 over the next several decades. Although reduced benefits will continue to be available at age 62, greater reductions for early receipt of benefits will be imposed to

account for the increased time between normal and early retirement.¹²

Except for the aforementioned disabled Americans and survivors of deceased workers, Social Security is not available prior to age 62, a consideration employees sometimes keep in mind when making retirement decisions.¹³ For those age 62 and above, the model calculates Social Security benefits and adds them to benefits received from the pension plan. In 1989, at age 62, employees retiring with 30 years of participation and a final salary of \$35,000 could expect an average private pension replacement rate of 27.4 percent and a Social Security replacement rate of 23.5 percent, for a total replacement of 50.8 percent of final salary. At age 65, the average replacement rates were 28.9 percent from private pensions and 29.4 percent from Social Security, for a total of 58.4 percent of final salary.¹⁴ (See table 4.)

The Social Security replacement rate data show clear variations by final salary level, for employees of similar ages and with similar numbers of years of employment covered by Social Security. At age 62, for example, an employee with a final salary of \$25,000 after 30 years of

covered service could expect Social Security to replace 29.0 percent of salary in 1989. For the same worker with a final salary of \$35,000, the Social Security replacement rate is 23.5 percent; for the worker whose final salary is \$45,000, it is 18.9 percent. Proportionately higher Social Security replacement rates can be expected at age 65, when unreduced benefits become available. But again, replacement rates decline as final salary increases, as shown in the following tabulation for employees aged 65 with 30 years of covered service:

Final salary	Social Security replacement rate (percent)
\$25,000	37.8
35,000	29.4
45,000	23.8

While benefits are available from both pensions and Social Security, which source provides the greater replacement of final salary is dependent on age and final salary: at age 62, Social Security provides the higher replacement rate for employees with 30 years of service and final salaries of \$15,000; at \$25,000, the replacement rates are nearly equal, while at greater

Table 5. Average percent of final salary replaced by defined benefit pension plan payments after reductions for preretirement and postretirement survivor benefits, by retirement age and years of participation in plan, full-time employees in medium and large private establishments, 1989

Retirement age and final annual salary	Years of participation in plan						
	10	15	20	25	30	35	40
Age 55							
\$15,000	6.9	10.0	14.0	17.1	22.9	26.5	29.6
20,000	6.5	9.4	13.0	15.8	20.5	23.7	26.4
25,000	6.3	9.0	12.3	15.2	19.3	22.3	24.8
35,000	6.0	8.8	12.0	14.9	18.5	21.5	23.8
45,000	6.0	8.9	12.0	15.0	18.5	21.4	23.6
55,000	6.1	9.0	12.1	15.2	18.5	21.5	23.6
Age 60							
\$15,000	9.6	14.0	18.9	23.4	28.2	31.8	35.4
20,000	8.9	12.9	17.2	21.1	25.3	28.4	31.5
25,000	8.6	12.2	16.1	19.9	23.9	26.8	29.7
35,000	8.1	11.9	15.7	19.3	23.2	26.0	28.6
45,000	8.0	11.9	15.5	19.3	23.1	25.9	28.3
55,000	8.1	12.0	15.7	19.4	23.2	26.0	28.4
Age 62							
\$15,000	10.5	15.2	20.4	24.9	29.8	33.7	37.6
20,000	9.8	14.0	18.5	22.5	26.7	30.1	33.5
25,000	9.4	13.3	17.4	21.3	25.3	28.5	31.5
35,000	8.9	12.9	17.0	20.7	24.6	27.7	30.5
45,000	8.9	13.0	16.8	20.7	24.7	27.7	30.3
55,000	9.0	13.1	17.0	20.9	24.9	27.9	30.4
Age 65							
\$15,000	11.4	16.7	21.7	26.2	30.8	35.2	39.1
20,000	10.5	15.3	19.7	23.7	27.6	31.6	35.0
25,000	10.1	14.4	18.5	22.6	26.3	29.9	33.0
35,000	9.6	13.9	18.1	22.0	25.9	29.2	32.2
45,000	9.4	13.9	18.0	22.2	26.0	29.2	32.0
55,000	9.6	14.0	18.3	22.5	26.3	29.5	32.1

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

Table 6. **Average percent of final salary replaced by total pension income (defined benefit pension plan, individual Social Security, and spouse's Social Security payments), by retirement age and years of participation in plan, full-time employees in medium and large private establishments, 1989**

Retirement age and final annual salary	Years of participation in plan						
	10	15	20	25	30	35	40
Age 62							
\$15,000	39.8	50.0	60.5	70.5	80.8	88.0	91.8
20,000	34.4	44.2	54.1	63.5	73.2	79.8	83.2
25,000	31.4	40.7	50.1	58.9	67.9	74.2	77.5
35,000	27.7	36.7	44.6	52.0	59.1	63.3	66.2
45,000	25.5	33.5	40.4	47.0	52.4	56.3	59.0
55,000	22.7	29.9	36.4	42.6	47.7	51.3	54.0
Age 65							
\$15,000	49.4	61.9	74.3	86.1	98.0	102.4	106.3
20,000	42.8	54.9	66.6	78.0	89.2	93.1	96.6
25,000	39.0	50.6	61.9	72.7	83.0	87.1	90.5
35,000	34.6	45.6	55.1	63.9	70.1	73.6	76.6
45,000	31.8	41.4	49.6	56.2	61.7	65.1	67.9
55,000	27.9	36.6	44.3	50.3	55.6	58.9	61.5

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

salaries, pensions provide the higher replacement rate. Again, this is due to the skewed formula for computing Social Security payments, as well as to those pension formulas that provide higher benefits as salary increases.

At age 65, Social Security provides a higher replacement rate than pension plans for 30-year employees with final salaries up to about \$35,000. At higher salaries, pension benefits provide the larger component of retirement income. The salary level at which average pensions and Social Security provide equal benefits rises from age 62 to age 65 in large part due to the greater, unreduced Social Security benefits available at age 65. There is a 20-percent difference between Social Security benefits at age 62 and at age 65, while the difference in average pension benefits at these ages is only about 5 percent.¹⁵

Benefits for married employees

The pension benefits discussed thus far were computed as if the retiree were to receive a *straight-life annuity*, that is, a periodic payment that ceases when the retiree dies. Since the mid-1970's, defined benefit pension plans have been required by law to offer an alternative form of payment, designed to protect a surviving spouse after a retiree dies.¹⁶ Such a benefit, known as a *qualified joint-and-survivor annuity*, provides a reduced pension to the retiree, followed by payment of a portion of that reduced pension to a surviving spouse after the retiree dies.

Beginning in the mid-1980's, the joint-and-survivor benefit became the standard pension form for married employees.¹⁷ Only with the written consent of both spouses can a married

employee choose something other than the joint-and-survivor benefit. By law, a plan must offer a 50-percent joint-and-survivor benefit, that is, a reduced annuity to the retiree and 50 percent of that reduced amount to the surviving spouse.

Plans frequently offer alternatives to the 50-percent benefit, with corresponding differences in the reduction to the retiree's benefit. A 25-percent joint-and-survivor benefit, for example, would yield only a small reduction in the retiree's benefit and a survivor pension equal to 25 percent of the reduced amount. Conversely, a 100-percent joint-and-survivor annuity would yield a large reduction in the retiree's benefit, followed by a benefit to the surviving spouse equal to the retiree's benefit. A small number of plans offer survivor benefits without imposing a reduction in the retiree's annuity.¹⁸

The reduction for a 50-percent joint-and-survivor annuity may be specifically expressed by the pension plan, for example, 8 percent of the retiree's annuity. More often, however, the reduction is actuarially computed to account for differences in the ages of the retiree and spouse and for the expected number of years each will receive benefits. Just like early retirement reductions, these calculations are designed to provide the same total benefit that, on average, would be paid to the individual retiree, except that it is spread out over the lifetime of both the employee and the spouse.¹⁹

Spouses also have protection available to them if employees die prior to retirement. Such benefits, called *qualified preretirement survivor annuities*, provide benefits to the surviving spouse beginning at the earliest time that the employee would have been eligible to retire.

Payments are typically equal to the benefit that would have been received at that date had the employee retired with a joint-and-survivor annuity and then died. For most pension plan participants, such protection is automatic, and the total amount of the annuity over its life is not affected by having this kind of coverage.²⁰ However, for 9 percent of participants in defined benefit pension plans in 1989, a cost, in the form of a small reduction in future benefits, was imposed.²¹

To present a realistic view of pension benefits available to married employees, additional replacement rates were calculated. These data assume that the retiree was covered by preretirement survivor protection as soon as it was available and opted for joint-and-survivor coverage.²²

Because preretirement survivor protection was often available without a corresponding reduction in benefits, average replacement rates after 30 years of participation dropped only 0.2 percentage point at age 55 and 0.3 percentage point at age 62 to account for such protection. Because it is unlikely that, where required, an employee would pay for preretirement survivor

protection, yet opt not to take postretirement survivor protection, average replacement rates for retirees covered only by preretirement survivor protection are not presented separately. Instead, data show the effect of electing both pre- and postretirement survivor protection.

The average replacement rate provided to the retiree choosing a joint-and-survivor annuity was about 90 percent of that available from a straight-life annuity, assuming the retiree and spouse were the same age. This reduction was constant, regardless of age, salary, or number of years of participation in the plan. For example, a worker retiring at age 55 with 30 years of participation and a final salary of \$35,000 would expect an average joint-and-survivor annuity replacement rate of 18.5 percent, compared with 20.6 percent for a straight-life annuity. For persons aged 62 and with a final salary of \$35,000, the 30-year joint-and-survivor replacement rate would average 24.6 percent, compared with 27.4 percent for a straight-life annuity. (See table 5.)

For married employees retiring at age 62 or later, Social Security benefits also are available for the spouse (assumed here to be the same age

Table 7. Average percent of deceased spouse's final salary replaced by defined benefit pension plan payments, by retirement age (or age at death) and years of participation in plan, full-time employees in medium and large private establishments, 1989

Retirement age (or age at death) and final annual salary	Years of participation in plan						
	10	15	20	25	30	35	40
Age 55							
\$15,000	3.5	5.2	7.2	8.8	11.8	13.6	15.3
20,000	3.3	4.9	6.7	8.1	10.5	12.2	13.6
25,000	3.2	4.6	6.3	7.8	9.9	11.5	12.7
35,000	3.1	4.6	6.2	7.6	9.5	11.0	12.2
45,000	3.0	4.6	6.1	7.6	9.4	10.9	12.1
55,000	3.1	4.6	6.2	7.7	9.4	11.0	12.1
Age 60							
\$15,000	4.9	7.2	9.7	12.1	14.5	16.4	18.3
20,000	4.6	6.7	8.8	10.8	13.0	14.6	16.2
25,000	4.4	6.3	8.3	10.2	12.3	13.8	15.3
35,000	4.1	6.1	8.0	9.9	11.9	13.3	14.7
45,000	4.1	6.1	7.9	9.8	11.8	13.3	14.5
55,000	4.1	6.1	8.0	9.9	11.9	13.3	14.5
Age 62							
\$15,000	5.4	7.9	10.5	12.9	15.4	17.5	19.5
20,000	5.0	7.3	9.6	11.6	13.8	15.6	17.3
25,000	4.8	6.9	9.0	10.9	13.0	14.7	16.3
35,000	4.6	6.7	8.7	10.6	12.7	14.3	15.7
45,000	4.5	6.7	8.6	10.6	12.7	14.2	15.6
55,000	4.6	6.7	8.7	10.7	12.8	14.3	15.6
Age 65							
\$15,000	5.9	8.6	11.2	13.6	16.0	18.2	20.3
20,000	5.4	7.9	10.2	12.2	14.3	16.3	18.2
25,000	5.2	7.4	9.6	11.6	13.6	15.4	17.1
35,000	4.9	7.1	9.3	11.4	13.4	15.1	16.6
45,000	4.8	7.1	9.2	11.4	13.4	15.1	16.5
55,000	4.9	7.2	9.4	11.6	13.5	15.2	16.6

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

as the retiree). Should the spouse not be entitled to Social Security based on his or her own work history, a spousal Social Security benefit, equal to 50 percent of the employee's primary insurance amount²³ and reduced for receipt prior to the age of eligibility for full Social Security benefits (currently age 65), is available.²⁴

Total family replacement rates were computed for retirees aged 62 and 65, assuming that the spouse was the same age and had no benefits based on personal work experience. The rise in two-worker couples in recent years suggests that these replacement rates may not account for all benefits actually available.²⁵ Thus, family replacement rates should be considered a floor of available protection: independent benefits received by the spouse, other benefit plans, and personal savings could all add to the total replacement rate.

At age 62 and with a final salary of \$35,000, the employee completing 30 years of participation in a plan would, on average, have a total replacement rate of 59.1 percent, composed of the following items:

Source	Percent
Joint-and-survivor pension	24.6
Individual Social Security	23.5
Spouse's Social Security	11.0
Total replacement rate	59.1

For the same employee at age 65, the replacement rates would be as follows:

Source	Percent
Joint-and-survivor pension	25.9
Individual Social Security	29.4
Spouse's Social Security	14.7
Total replacement rate	70.1

Table 6 provides further details on total family replacement rates by age, salary, and length of participation.

Surviving spouse benefits

The final step in computing replacement rates from defined benefit pension plans is to determine the benefit available to the spouse following the death of an employee or retiree. In most plans, the benefit is identical whether the employee dies before or after retirement, given the same age, salary, and number of years of participation in the plan. This is because preretirement survivor benefits are typically computed as if the deceased employee had retired with a joint-and-survivor annuity prior to dying. Therefore, the survivor replacement rates presented can be considered both pre- and postretirement benefits.

Because survivor benefits are expressed as a percentage of retiree benefits, they exhibit the same variations by age, salary, and length of participation as do retiree benefits. On average,

the survivor pension replacement rate is slightly more than 50 percent of the joint-and-survivor replacement rate, because a minority of plans only offer survivor benefits that are greater than 50 percent. The survivor replacement rate at age 55, based on an employee's 30-year, \$35,000 final salary benefit, averaged 9.5 percent in 1989. At age 60, the rate rose to 11.9 percent, and at age 65, it reached 13.4 percent. (See table 7.)

Social Security benefits are available to surviving spouses at age 60, or earlier if the spouse has dependent children.²⁶ The amount is reduced if benefits are paid prior to the normal retirement age.²⁷ Combined survivor pension and Social Security replacement rates, based on 30 years of participation and a final salary of \$35,000, averaged 32.1 percent at age 60, 37.0 percent at age 62, and 42.8 percent at age 65. The increases at later ages are due almost entirely to increases in Social Security benefits. (See table 8.)

Other retirement income

As noted earlier, retirement income is typically derived from three sources: employer benefit plans, government benefit plans, and personal savings. This analysis has examined one type of employer benefit plan—the defined benefit pension plan. Also available to some employees are *defined contribution plans*, which specify the employer's contribution to employee accounts, but do not guarantee future benefits. There are several types of defined contribution plans, including savings and thrift, profit-sharing, and money purchase pension plans.²⁸ In 1989, 48 percent of full-time employees in medium and large private establishments participated in one or more defined contribution plans; the majority of these participants were in plans designed to provide benefits at retirement.²⁹

Because defined contribution plans do not include formulas for computing benefits, it is difficult to estimate payouts from such plans. Variables such as employee contributions, company profits, and investment returns make determinations of replacement rates uncertain. Nonetheless, an analysis of 1989 savings and thrift plans, the most prevalent type of defined contribution plan among full-time employees in medium and large private establishments, yielded some estimates of the total benefits available. The average cumulative account balance, based on 30 years of plan participation, a final salary of \$35,000, and a 6-percent annual interest rate, was \$70,314.³⁰ Benefits from defined contribution plans are typically paid in a lump sum, from which a retiree may purchase an annuity providing periodic payments during his or her lifetime.

Table 8. Average percent of deceased spouse's final salary replaced by defined benefit pension plan and Social Security payments, by retirement age (or age at death) and years of participation in plan, full-time employees in medium and large private establishments, 1989

Retirement age (or age at death) and final annual salary	Years of participation in plan						
	10	15	20	25	30	35	40
Age 60							
\$15,000—total	22.4	27.8	33.4	38.9	44.4	49.4	51.3
Survivor pension	4.9	7.2	9.7	12.1	14.5	16.4	18.3
Survivor Social Security	17.4	20.6	23.7	26.8	29.9	33.0	33.0
\$25,000—total	17.3	22.4	27.4	32.2	37.1	41.4	43.2
Survivor pension	4.4	6.3	8.3	10.2	12.3	13.8	15.3
Survivor Social Security	13.0	16.1	19.2	22.0	24.8	27.6	27.9
\$35,000—total	15.2	20.0	24.2	28.1	32.1	34.8	36.3
Survivor pension	4.1	6.1	8.0	9.9	11.9	13.3	14.7
Survivor Social Security	11.1	13.9	16.2	18.2	20.2	21.5	21.6
\$45,000—total	13.8	18.1	21.6	25.2	28.4	30.5	31.8
Survivor pension	4.1	6.1	7.9	9.8	11.8	13.3	14.5
Survivor Social Security	9.8	12.0	13.7	15.3	16.5	17.3	17.3
Age 62							
\$15,000—total	26.1	32.4	38.8	45.0	51.4	55.7	57.7
Survivor pension	5.4	7.9	10.5	12.9	15.4	17.5	19.5
Survivor Social Security	20.6	24.5	28.3	32.2	36.0	38.2	38.2
\$25,000—total	20.3	26.2	32.0	37.5	43.1	47.0	48.7
Survivor pension	4.8	6.9	9.0	10.9	13.0	14.7	16.3
Survivor Social Security	15.5	19.3	23.0	26.5	30.0	32.3	32.4
\$35,000—total	17.8	23.4	28.2	32.7	37.0	39.4	40.9
Survivor pension	4.6	6.7	8.7	10.6	12.7	14.3	15.7
Survivor Social Security	13.3	16.8	19.5	22.1	24.3	25.1	25.2
\$45,000—total	16.2	21.1	25.2	29.2	32.3	34.4	35.8
Survivor pension	4.5	6.7	8.6	10.6	12.7	14.2	15.6
Survivor Social Security	11.7	14.5	16.6	18.6	19.6	20.2	20.2
Age 65							
\$15,000—total	31.2	38.8	46.3	53.5	60.8	63.0	65.1
Survivor pension	5.9	8.6	11.2	13.6	16.0	18.2	20.3
Survivor Social Security	25.3	30.2	35.0	39.9	44.8	44.8	44.8
\$25,000—total	24.5	31.6	38.4	45.0	51.4	53.6	55.4
Survivor pension	5.2	7.4	9.6	11.6	13.6	15.4	17.1
Survivor Social Security	19.2	24.1	28.9	33.4	37.8	38.2	38.3
\$35,000—total	21.6	28.3	34.0	39.3	42.8	44.7	46.2
Survivor pension	4.9	7.1	9.3	11.4	13.4	15.1	16.6
Survivor Social Security	16.7	21.2	24.6	27.9	29.4	29.6	29.6
\$45,000—total	19.7	25.5	30.3	34.1	37.2	39.0	40.4
Survivor pension	4.8	7.1	9.2	11.4	13.4	15.1	16.5
Survivor Social Security	14.9	18.4	21.1	22.6	23.8	23.9	23.9

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan. Because of rounding, sums of individual items may not equal totals.

Employees may participate in a defined contribution plan rather than a defined benefit plan, or they may have the opportunity to participate in both types of plans. In 1989, 45 percent of defined benefit pension plan participants also were enrolled in one or more defined contribution plans, most often a savings and thrift plan. For such individuals, the replacement rates described here would be supplemented by defined contribution payouts.

Methods of encouraging personal savings through tax incentives, such as *individual retirement accounts* and *Internal Revenue Code section 401(k) plans* (sponsored by an employer), have received considerable attention.³¹ However, because individual savings amounts are not known, replacement rate data from personal savings cannot be computed. The data presented

here on average pension and Social Security replacement rates may, nonetheless, provide an indicator of the amount of income a retiree might need from personal savings to maintain a certain lifestyle.

RETIREMENT INCOME may be of little interest to active employees, especially younger ones. Nevertheless, the new data show that retirement benefits can vary widely, and choices about the age at which to retire and the number of years one should participate in an individual pension plan can have a dramatic effect on benefits. The data presented in this article offer a comprehensive look at the income a retiree might expect to receive; they serve as a benchmark to compare individual benefits and as an impetus to plan for future retirement needs. □

¹ For a discussion of the adequacy of retirement income benefits, see *Coming of Age: Toward a National Retirement Income Policy* (President's Commission on Pension Policy, Feb. 26, 1981), pp. 42-43.

² See Donald G. Schmitt, "Today's pension plans: how much do they pay?" *Monthly Labor Review*, December 1985, pp. 19-25.

³ For complete details on the Employee Benefits Survey, see *Employee Benefits in Medium and Large Firms, 1989*, Bulletin 2363 (Bureau of Labor Statistics, 1990). This bulletin presents limited data on replacement rates for defined benefit pension plans. Differences between data from the bulletin and data presented in this article are due to refinements in the Bureau's calculations of replacement rates.

⁴ Other formulas include those that base benefits on a percent of career contributions and cash account plans, both of which require periodic contributions. Such formulas were not included in calculations of replacement rates.

⁵ Employers frequently design pension benefits in coordination with anticipated Social Security payments. For further details, see Donald Bell and Diane Hill, "How social security payments affect private pensions," *Monthly Labor Review*, May 1984, pp. 15-20.

⁶ Employers often impose service requirements as a criterion of eligibility for participation in a plan. In plans where service during the preparticipation period is included in the determination of the number of years of participation for the purpose of calculating the pension benefit, the number of years of participation will equal the number of years of service. In other plans, the years of participation are only those years after service requirements—typically, no greater than 1 year—are met.

⁷ Formulas that vary benefits by salary level are designed to account for employer contributions to Social Security. See Bell and Hill, "How social security payments affect private pensions."

⁸ Social Security benefits are calculated as a percent of an employee's average indexed earnings, as defined by the Social Security Administration. The percentage declines as average indexed earnings increase.

⁹ Benefits presented in this article for a given age and length of participation include only those specified in plans that permit employees to retire at that combination of age and length of participation.

¹⁰ Reductions may be based on actuarial assumptions concerning life expectancy. In such a case, the present value of the future stream of reduced benefits is equal to the present value of the future stream of unreduced benefits payable at normal retirement age. Plans may also stipulate reductions not specifically based on actuarial assumptions, for example, a 3-percent reduction for each year the retiree is below normal retirement age.

¹¹ At age 65, all participants were eligible for normal retirement benefits.

¹² The reduction is currently 5/9 of 1 percent per month from age 65 to age 62. Therefore, at age 62 the benefit is 80 percent of the unreduced benefit.

¹³ A minority of defined benefit pension plans include a supplemental payment for employees retiring prior to eligibility for Social Security. Such supplements were not included in the calculations of replacement rates because of their low incidence and the small effect they have on average benefits. If they were included, average replacement rates would typically rise by less than 1 percentage point. For more details on supplemental payments, see

William J. Wiatrowski, "Supplementing retirement until Social Security begins," *Monthly Labor Review*, February 1990, pp. 25-29.

¹⁴ The Social Security replacement rates presented throughout the discussion and in tables 4, 6, and 8 are computed using the same number of years of participation that are used for the pension calculation. For example, the Social Security replacement rate for a worker aged 62 with 10 years of participation in a plan assumes 10 years of earnings in employment covered by Social Security.

In actuality, many workers have additional Social Security earnings under prior employment that would increase their benefit. To approximate such higher Social Security benefits based on a given final year's salary, use the Social Security replacement rate data from table 4 for the total number of years under Social Security. For example, the average replacement rate for an employee retiring at age 62 with a final salary of \$35,000 and 10 years of participation, but 30 years of Social Security earnings, would equal 9.9 percent from the pension plan (table 4, 10 years, \$35,000 pension replacement rate) plus 23.5 percent from Social Security (table 4, 30 years, \$35,000 Social Security replacement rate), for a total of 33.4 percent.

¹⁵ The difference between Social Security benefits at age 62 and at age 65 is slightly more than 20 percent, because cost-of-living increases are added to the employee's originally computed benefit when retirement occurs after age 62. Thus, retirees at age 62 receive 80 percent of the original benefit (without increases), while retirees at age 65 receive 100 percent of the original benefit, plus increases.

The difference in average pension benefits at different ages becomes smaller as age increases, because many plans provide unreduced benefits prior to age 65, and even when reductions are imposed, they apply for fewer years.

¹⁶ The provisions were required by the Employee Retirement Income Security Act of 1974, Public Law 93-406.

¹⁷ These changes were required by the Retirement Equity Act of 1984, Public Law 98-397.

¹⁸ For further details on survivor provisions in defined benefit pension plans, see Donald Bell and Avy Graham, "Surviving spouse's benefits in private pension plans," *Monthly Labor Review*, April 1984, pp. 23-31.

¹⁹ The calculations are designed to provide to retiree and survivor a future stream of benefits that has a present value equivalent to the unreduced stream of payments from a straight-life annuity.

²⁰ Preretirement survivor coverage typically goes into effect at age 35.

²¹ For example, 0.1 percent for each year the option is in effect. For an employee with 20 years of participation, the reduction would be 2 percent of the accrued benefit.

²² If the plan offered a postretirement survivor option without imposing a pension reduction, that option was used. Where multiple joint-and-survivor options were available, the lowest option equal to or greater than 50 percent was used.

²³ The primary insurance amount is the full benefit the employee is entitled to at normal retirement age.

²⁴ A spouse Social Security benefit is reduced by 25/36 of 1 percent for each month that benefits are received before the Social Security normal retirement age. Thus, at age 62, a spouse would receive 75 percent of the unreduced spouse benefit. Because the unreduced spouse benefit is 50 percent of the employee's primary insurance amount, the final benefit to the spouse at age 62 is 37.5 percent of the employee's primary insurance amount (75 percent of the 50-percent unreduced spouse benefit).

²⁵ For information on changes in the composition of the labor force, including data on two-earner families, see *Employment and Earnings*, Bureau of Labor Statistics, January 1991.

²⁶ If a spouse is receiving Social Security at the time of the retiree's death, benefits are recomputed; the resulting payment is equal to what the retiree's full Social Security benefit would have been had the retiree begun receiving benefits no earlier than the Social Security normal retirement age (currently age 65). This calculation assumes that the spouse is not eligible for an independent Social Security benefit. If such an independent benefit is available, the spouse receives the greater of the independent benefit or the recomputed spouse benefit.

²⁷ The reduction in survivor Social Security benefits is 19/40 of 1 percent for each month that benefits are received before the Social Security normal retirement age (currently age 65). For a survivor receiving benefits at age 60, current reductions would provide a benefit equal to 71.5 percent of the primary insurance amount.

²⁸ A savings and thrift plan requires an employee to contribute a percent of salary, which is typically matched, in whole or in part, by the employer. A profit-sharing plan determines benefits on the basis of a stated formula or at the discretion of a board of directors. Benefits are then allocated to individual employees, typically based on salary. A money purchase pension plan provides a fixed employer contribution to an employee account each year. For more information, see *Employee Benefits in Medium and Large Firms, 1989*, Bulletin 2363 (Bureau of Labor Statistics, 1990).

²⁹ A defined contribution plan is considered a retirement plan if an employee cannot have access to the employer's contributions prior to retirement age, death, disability, or hardship.

³⁰ See Michael Bucci, "Contributions to savings and thrift plans," *Monthly Labor Review*, November 1990, pp. 28-36.

³¹ See "Individual Savings for Retirement—The 401(k) and IRA Experiences," *EBRI Issue Brief* (Employee Benefit Research Institute, October 1989).

APPENDIX

Calculating replacement rates

In an effort to provide defined benefit pension plan data appropriate for employees with a variety of work histories, rather than for one "average" employee, numerous retirement ages, final salaries, and lengths of participation were compared against the Employee Benefit Survey's data base of pension plan provisions. The particular values of these variables were chosen to correspond with past analysis¹ and to meet the interests of a variety of data users. For example, among the retirement ages chosen were age 55, the earliest age that most participants were able to retire; age 62, the earliest age that Social Security retirement benefits are available; and age 65, the "traditional" retirement age in the United States (and the current age at which full Social Security benefits may be received).

Once these assumptions were made, complete salary histories were calculated. Employees were assumed to have retired at the beginning of 1989, so final salaries were for 1988. Nationwide increases in average wages, as determined by the Social Security Administration, were applied to the employee's salary beginning in the first year of participation in the plan; such increases were factored into the reported final salary in 1988. Also computed from the salary histories were Social Security benefits, using the formula in effect for employees retiring in 1989. Average salaries, as specified by individual plans, were computed for use in pension calculations.

Formulas for which replacement rates were computed for defined benefit pension plans were those applicable to current service. When a pension plan formula is revised, the new formula typically applies to current service (service beginning at the date of the revision), while a previous formula may apply to prior service. Where such changed formulas

were encountered, all service was treated as applying to the current formula.

When a pension plan did not specify a figure or formula for a given provision (for example, reductions for early retirement), the plan typically stated that standard actuarial calculations were made. In such cases, data used by the Pension Benefit Guaranty Corporation in computing pension benefits were applied.²

Benefits were calculated for individual plans using the unique provisions of each plan. Average benefits were then computed, with individual plans weighted by the number of active workers participating in each plan.³

Standard errors for replacement rate data were not computed because the data are projections based on stated assumptions, rather than estimates from a sample. Standard errors are computed for the underlying pension provision data, however. Standard errors for the 1989 Employee Benefits Survey ranged up to plus or minus 2.2 percentage points for estimates at the 50-percent level. Complete details of these standard errors may be found in appendix A of *Employee Benefits in Medium and Large Firms, 1989*.⁴

Replacement rates by occupation

Replacement rates were developed from Employee Benefits Survey data for employees in three broad occupational groups: professional and administrative employees, technical and clerical employees, and production and service employees. Typically, the data by occupational group follow the same general patterns as those presented for all workers. Nonetheless, some differences in plan provisions

Table A-1. Average percent of final salary replaced by defined benefit pension plan payments, by retirement age, years of participation in plan, final salary, and occupational group, full-time employees in medium and large private establishments, 1989

Retirement age and final annual salary	Worker group and years of participation in plan								
	Professional and administrative			Technical and clerical			Production and service		
	20 years	30 years	40 years	20 years	30 years	40 years	20 years	30 years	40 years
Age 55									
\$15,000	14.7	23.4	29.9	15.6	24.0	30.8	16.2	27.3	36.1
25,000	13.9	21.3	27.1	14.4	21.8	27.8	13.0	21.2	27.8
35,000	14.1	21.5	27.4	14.4	21.9	27.8	12.3	19.2	25.2
45,000	14.4	22.2	28.1	14.6	22.3	28.2	11.8	18.4	24.0
Age 60									
\$15,000	19.8	29.8	37.0	20.5	30.4	37.8	21.9	32.6	41.7
25,000	18.2	26.9	33.0	19.0	27.9	34.2	17.1	25.6	32.4
35,000	18.6	27.2	33.4	19.0	28.2	34.5	15.8	23.4	29.4
45,000	19.0	28.0	34.1	19.3	28.8	35.0	15.0	22.5	28.0
Age 62									
\$15,000	21.2	31.2	38.8	21.5	31.1	38.6	24.0	35.3	45.4
25,000	19.6	28.3	34.9	20.1	28.8	35.3	18.7	27.7	35.1
35,000	20.1	28.9	35.6	20.3	29.5	36.1	17.3	25.3	31.9
45,000	20.6	29.9	36.5	20.7	30.4	37.0	16.5	24.4	30.4
Age 65									
\$15,000	23.1	32.8	41.1	23.3	32.8	41.2	25.2	36.2	46.6
25,000	21.2	29.9	37.2	21.7	30.5	37.9	19.8	28.4	36.2
35,000	21.6	30.9	38.1	22.0	31.6	38.9	18.2	26.3	33.1
45,000	22.2	32.0	39.1	22.5	32.7	39.8	17.4	25.4	31.6

NOTE: Average replacement rates are for only those workers in plans permitting retirement at the given combination of age and number of years of participation in plan.

Table A-2. Percent of defined benefit pension plan participants eligible for benefits at selected ages and years of participation in plan, by occupational group, full-time employees in medium and large private establishments, 1989

Age and eligibility	Worker group and years of participation in plan								
	Professional and administrative			Technical and clerical			Production and service		
	10 years	20 years	30 years	10 years	20 years	30 years	10 years	20 years	30 years
Age 55									
Eligible for benefits	71	91	93	73	92	95	59	76	87
Unreduced normal retirement benefits	(¹)	5	19	(¹)	6	14	1	5	22
Reduced early retirement benefits	71	85	75	72	86	80	59	70	65
Age 62									
Eligible for benefits	84	98	100	82	98	100	83	98	98
Unreduced normal retirement benefits	32	44	58	29	41	57	37	47	63
Reduced early retirement benefits	52	54	41	53	57	43	45	50	35

¹ Less than 0.5 percent.

NOTE: Because of rounding, sums of individuals items may not equal totals.

lead to variations in replacement rates between the two white-collar groups (professional and administrative employees and technical and clerical employees) on the one hand and the blue-collar group (production and service employees) on the other.

A review of defined benefit pension plan provisions from the 1989 survey reveals several differences by occupation, typically between white- and blue-collar workers:

- White-collar workers nearly always had earnings-based benefits, while almost 40 percent of blue-collar workers had benefits calculated as a dollar amount times number of years of service.
- White-collar benefits were more commonly coordinated with Social Security benefits than were blue-collar benefits, a trend related to the type of benefit formula applied in each case.
- White-collar workers were more likely than their

Table A-3. **Average percent of final salary replaced by defined benefit pension plan and Social Security payments, by occupational group, for retirees age 65 with 30 years of participation in pension plan, full-time employees in medium and large private establishments, 1989**

Retirement age, final annual salary, and source of benefits	Professional and administrative participants	Technical and clerical participants	Production and service participants
\$25,000—total	67.7	68.3	66.2
Pension	29.9	30.5	28.4
Social Security	37.8	37.8	37.8
\$45,000—total	55.8	56.5	49.2
Pension	32.0	32.7	25.4
Social Security	23.8	23.8	23.8

blue-collar counterparts to participate in plans imposing a limit on years of credited service.

- While more white-collar than blue-collar participants could retire at age 55, a greater proportion of blue-collar workers could retire with unreduced benefits.
- Slightly more blue-collar than white-collar workers had their available survivor benefits computed as a percent of the retiree's benefit, with no reduction imposed to pay for survivor protection.

These differences affect the amount of income replaced, as age, final salary, and years of participation in a plan vary. For example, as their final salaries increase, white-collar retirees of the same age and with identical years of participation tend to have similar replacement rates. This similarity reflects the fact that most white-collar workers have percent-of-salary plans. Blue-collar workers, however, experience declining replacement rates as their final

salaries increase, reflecting the fact that fixed flat-dollar formula benefits are divided by larger and larger salaries.⁵ (See table A-1.)

Blue-collar workers experience greater replacement rate increases as their number of years of participation increases than do white-collar workers, due at least in part to the lower incidence of limitations on credited service. In addition, blue-collar workers can receive unreduced benefits at younger ages; thus, their benefits did not increase with age as much as did white-collar benefits. (See table A-2.)

Social Security benefits and replacement rates are identical for all workers regardless of occupation, because identical salary, service, and age criteria are used. However, differences by occupation do exist in the percent of the total replacement rate composed of pension versus Social Security benefits. At age 65 with 30 years of participation, for final salaries of \$25,000 and \$45,000, average replacement rates by occupation were as shown in table A-3. (Note that the variations in these average replacement rates are a direct result of the variations in the replacement rates afforded by pensions, as discussed earlier.)

With regard to joint-and-survivor benefits, replacement rates by occupational group follow much the same patterns as those for straight-life annuities. On average, the reduction imposed to account for providing a survivor annuity is slightly less for blue-collar than for white-collar workers, due to the greater percent of blue-collar workers in plans imposing no reduction. This difference results in slightly higher replacement rates for joint-and-survivor benefits, as a percent of the replacement rate for a straight-life annuity, for blue-collar workers.

Finally, survivor annuities continue the patterns shown: as a percent of the joint-and-survivor annuity, there is virtually no difference by occupation. Survivors received, on average, just over 50 percent of the joint-and-survivor annuity.

Footnotes to the appendix

¹ See Donald G. Schmitt, "Today's pension plans: how much do they pay?" *Monthly Labor Review*, December 1985, pp. 19-25; Michael Bucci, "Contributions to savings and thrift plans," *Monthly Labor Review*, November 1990, pp. 28-36; and Adam Z. Bellet, "Employer-sponsored life insurance: a new look," *Monthly Labor Review*, October 1989, pp. 25-28.

² The Pension Benefit Guaranty Corporation administers a Federal pension guarantee program. Assumptions concerning actuarial reductions for early retirement and concerning the reduction in the retiree's annuity to account for the selection of a joint-and-survivor option, as specified by the corporation, were used when required.

³ Sample weights assigned to each establishment surveyed were also applied to permit the representation of all establishments in the survey universe, not only those providing data.

⁴ Bulletin 2363 (Bureau of Labor Statistics, 1990).

⁵ The same final salary levels and earnings histories were used for all three occupational groups studied. Nevertheless, some of the final salary levels presented would not have wide applicability in each occupational group. For example, it is unlikely that many technical-clerical workers in medium and large private establishments had final salaries as high as \$55,000, nor is it likely that many professional/administrative workers had final salaries as low as \$15,000. Because pension benefit formulas often are designed for a specific group of workers with a known range of salaries, some distortion in benefits at unlikely salary levels is possible. Thus, in examining the results of this analysis, care should be taken to focus on the benefits provided at salary levels applicable to a particular occupational group.